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Capturing indigenous knowledge of small grain production

Abstract

Many Iowa farmers lack the knowledge base to grow small grains successfully. This grant supported visits and interviews with farmers across Iowa during small grains field operations in 2014. The goal was to capture the nuts and bolts of small grains production in both conventional and organic systems to facilitate greater adoption of these sustainable systems.

Keywords

Cover crops double crops strip cropping, Integrated crop-livestock systems and diversity

Disciplines

Agronomy and Crop Sciences | Horticulture | Indigenous Studies



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Abstract: Many Iowa farmers lack the knowledge base to grow small grains successfully. This grant supported visits and interviews with farmers across Iowa during small grains field operations in 2014. The goal was to capture the nuts and bolts of small grains production in both conventional and organic systems to facilitate greater adoption of these sustainable systems.

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Budget:
\$25,000 for year one

Q What practices have farmers in Iowa used to grow, harvest, and store small grains?

A Farmers shared answers regarding their production methods and their solutions to logistical issues. Their knowledge was passed along in articles, webinars, field days, and conference presentations.

Background

Monoculture cropping systems of alternating corn and soybeans or continuous corn are the predominant agriculture type in Iowa. Low-diversity cropping systems such as these tend to be heavily dependent on fossil fuels and agrichemicals. These production systems are coupled with a range of negative impacts to the environment and society.

Diversification of cropping systems has been touted as a strategy for balancing productivity, profitability and environmental health. This idea is supported in part by recent Leopold Center-funded work investigating extended crop rotations. Adding a small grain to a corn-soybean cropping system is a simple, incremental step that can make a farming system more sustainable.

Farmers with conventional corn-soybean systems tell Practical Farmers of Iowa (PFI) that they are not confident in their background and ability to grow small grains. In the distant past, these crops were grown on most Iowa farms, but that has not been the case for the last two generations. The traditional chain of farmer knowledge—passed on from generation to generation—regarding successful small grains production has largely been broken on Iowa farms. Farmers interested in growing small grains today often have no one, not family or a neighbor, to turn to for advice. PFI hopes to bridge this knowledge gap by capturing and sharing what has been learned by Iowa farmers who grow small grains.

Approach and methods

Farm visits and in-depth interviews were conducted with nine Iowa farmers regarding their specific small grain production practices. Subjects were contacted prior to the interview and provided with the interview questions. Interviews were scheduled to include a hands-on element, i.e., the interviewer talked and did field work. All interviewees were asked a set of introductory questions about their farm experience, demographics and motivations for using small grains in crop rotation.

A standard set of topics was explored, with varying focus depending on the seasonal timing of the farm visit. Among the topics considered:



Earl Hafner harvests his wheat.

Improve Small Grain Stand Establishment

- Where in the cropping sequence does a small grain fit best?
- Which seedbed preparation methods are best for improved stand establishment?
- For each planting method, what is the ideal seeding rate and date for each of the small grains?
- Which planter/drill and planter/drill settings provide the best small grain stands?

Maximize Small Grain Yield

- What type, timing, and application rates of manure or fertilizers improve yield?
- How does including a legume (plant that forms a symbiotic relationship with nitrogen-fixing bacteria) affect small grain yield and ease of harvest?
- Which mix of legumes produces the greatest amount of nitrogen and how does that improve subsequent corn yields and economic return?
- What harvester settings improve yield and clean out?
- What speed is best for harvesting small grains?
- What are the best methods for raking, baling, and using straw?

Optimize Post-Harvest Handling and Seed Quality

- What grain moisture percentage is best for harvesting small grains?
- What are the best on-farm post-harvest handling procedures?
- Which steps for bin management result in the best stored grains?

Data were collected through photographs, rigorous note-taking, and audio and video recordings. Interview transcripts were coded and categorized by the lead PI to reveal common themes within and across farmer interviews. Also, emergent themes were used to inform subsequent interviews as well as guide preparation of outreach and educational materials. These themes will direct future Practical Farmers' work related to archiving and sharing farmer small grains knowledge. [See appendix at end for table of emergent themes.]

Results and discussion

Among the themes that emerged from the data collected for this work:

- The timetable for small grains field work is different than row crops for both planting and harvest – they help a farmer to cover all acres in a timely manner.
- Seed bed preparation is the key to success.
- Small grains are “more forgiving” with respect to management and environmental conditions.
- Small grains are easier to grow than corn and beans.
- Because of a lack of research, production information, and markets, small grains currently are not as profitable as corn and soybeans when compared on a year-to-year basis.
- Small grains offer multiple benefits, including increased long-term profit potential and lessened environmental impacts that are hard to “pencil out”/“dollar up” in per-year accounting. Most farmers don’t expect small grains to make as much money as corn or soybeans, but plan on savings in the other years via reduced agrichemical inputs and over the long run by building soil organic matter.



*Dick Sloan, shown with
oats interseeded with
clover.*

Markets are a critical issue, but diversity can be used as an asset if you can establish the enterprise.

- Growing small grains allows farmers the opportunity to grow livestock feed on-farm, eliminating dependence on feed companies.
- By allowing them to intervene at different times of the year, growing small grains gives farmers an expanded toolbox with which to manage weeds and pests.
- Growing small grains allows farmers to incorporate green manure crops such as diverse cover crop mixes and clover by allowing them either to inter-seed or plant these crops in the summer. Green manure crops and mixes can not only fix nitrogen, but also protect from soil erosion, build organic matter, suppress weeds, and provide forage for livestock.

Conclusions

Farmers say that lack of knowledge is a major barrier to including small grains in the crop rotation. The small grains farmers interviewed for this project suggest that those new to small grains shouldn't hesitate to give them a try. Small grains can be successfully established with a several types of equipment: planter, seed drill, and broadcast, either terrestrially or aerially. It has been suggested that any farmer who is successful with corn and bean best management practices can achieve success with small grains. As with adopting any new agricultural practice, farmers new to small grains should start with a modest amount of acreage.

Impact of results

Farmer knowledge of small grains practices was captured and details and narrative can be referenced through 11 publications, archived "farminars" and PFI annual conference content. Additionally, video content is forthcoming.

The PI's team conducted five "farminars" that were viewed by 731 people; 35 farmers attended the small grains session at the PFI Cooperators' Meeting; four field days with small grains topics were attended by 246 people; and annual conference sessions featuring a small grains focus were attended by 408 people. In total, 1,420 people have accessed the small grains information and outreach generated as part of this grant. A research report and corresponding outreach pieces addressing the economics of small grain production will be available in 2015.

Education and outreach

Media coverage

- These Aren't Your Grandfather's Oats – *Wallaces Farmer*, March 2014
- PFI Whiskey Shows Potential for Local Small Grains Markets – *The Practical Farmer*, spring 2014
- Conversations on Extended Rotation – *The Practical Farmer*, spring 2014
- Extend Your Crop Rotation – *Wallaces Farmer*, June 2014
- Diversifying Production by Growing Cover Crop Seed – *Wallaces Farmer*, July 2014
- From Hogs to Whiskey: Making Use of Small Grains – *Wallaces Farmer*, August 2014

- Cereal Rye “Rules” in Iowa – *The Practical Farmer*, Summer 2014
- Capturing Farmer Knowledge of Small Grains Production – *The Practical Farmer*, Summer 2014
- Adding Crop Diversity Brings Biodiversity – *Wallaces Farmer*, October 2014
- Building Soil at Maple Edge Farm – *The Practical Farmer*, Fall 2014
- Small Grains Offer Many Benefits in Crop Rotation – *Organic Broadcaster*, January 2015

Links to articles above are on the PFI Blog: Small Grains Production Resources:
<http://practicalfarmers.org/blog/2015/05/14/small-grains-production-resources/>

Four field days were held in 2014 on small grains-related topics:

- Winter Cereal Rye for Cover and Cash Grain – June 10
- Three-crop Rotations, Cover Crops and Prairie for Conservation – June 19
- Stewardship at Seven W Farms – September 26
- Milling Small Grains and Aquaponics Production – November 15

In 2014 and early 2015 five “Farminars” were presented on small grains:

(see <http://practicalfarmers.org/farmer-knowledge/farminar-archive/>)

- Extending the Rotation beyond Corn and Beans – November 24, 2014
- Getting Started in Dairy Farming – December 2, 2104
- Setting up Fall and Spring Small Grains for Success – February 3, 2015
- Oats for Iowa: Variety Selection and Agronomic Tips – February 10, 2015
- Cereal Rye: Stand Evaluation and Seed Selection – February 17, 2015

During the January 2015 PFI annual conference, there were six sessions featuring small grains.

Leveraged funds

No additional funds were leveraged by this grant.

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Emergent themes from small grains knowledge interviews

Theme descriptions	Aspects of theme
Small grains are easier to grow than corn and beans	Small grains are “more forgiving” with respect to management and environmental conditions.
	Early growth suppresses weeds and therefore doesn’t succumb to the same weed pressures that can hinder row crops.
	Small grains can be farmed with a variety of equipment – i.e. it’s easier to start out without purchasing new equipment; “start small, maybe 5 acres.”
	There are multiple harvest strategies (e.g. combine, swath, bale, ensile, graze).
	There are multiple use strategies (e.g. sell for food grade, sell for feed grade, use as forage).
	BMPs will encourage high yields, but moderate yields can be achieved with “haphazard practice and some luck.”
Seed bed preparation is the key to success	Must have good seed to soil contact
	Take the time to disc/harrow the field, perhaps multiple times, especially when planting into ground that was previously corn.
	Small grains following soybeans is best.
	If following corn, the field must be disc/chop multiple times to reduce residue size.
	If broadcasting then a roller/packer will improve the stand. Roller packing is a useful strategy even if drilling.
	“Don’t try this in no-till systems unless you have lots of experience”
Small grains offer multiple benefits that are hard to “pencil out”/“dollar up” in per year accounting	Small grains may not compete “on paper” year to year with row crops, but the intangible things are what makes them worth having in a crop rotation.
	Positive impacts on soil health; improved tilth, “mellow soil”, different root types, depths and timing are all hard to capture economically.
	Small grains can be a key part of an integrated pest management strategy for weeds, insects, and disease – money savings are evident but hard to quantify.
Markets are a critical issue, but use diversity as an asset if you can establish the enterprise	The lack of markets is a critical issue and driver of declining acreage in Iowa, but each of these farmers has found a unique way, and “markets do exist”.
	For small grains to gain popularity “we need integrated crop and livestock production.”
	Small grains work well in a tiered use approach based on crops quality in situ at time of harvest: Food grade/feed grade/feed animals/forage/silage/ green chop/bale.
	Cover crop seed – specifically cereal rye and oats – is an emerging market for small grains.
Offset timing of the field work is a big advantage	Time table for small grains field work is different than row crops for both planting and harvest
	Allows for cropping success in parts of the field/farm that may be too wet for row crop seeding due to spring rains
	Allows for cropping success in parts of the field/farm that may be too dry by August due to lack of rain
	As farms get bigger, small grains production may be the only way a farmer can cover all acres in a timely manner